

## ASHRAE MEETING MINUTES (Approved) Winter Conference - Atlanta, GA

### TRG4.IAQP

#### Indoor Air Quality Procedure Development

Day: Sunday Location: Omni Hotel at CNN Center  
Date: 13 January 2019 Tower: M3, North Tower  
Time: 10:30 - 12:00 Room: Walnut (see map at end of Agenda)

- =====
1. [Call to Order \(10:30\)](#). Introduction of guests and members
  2. [Roster](#):
    - [\(Voting\) Members \(15\)](#) - Marwa Zaatari, Nick Agopian, Charlene Bayer, Robert Burkhead, Barney Burroughs, Jim Dennison, Elliot Horner, Gemma Kerr, Chang-Seo Lee, Chris Muller, Jeff Roseberry, Charlie Seyffer, Scott Sherwood, Erica Stewart, Scott Williams
    - [Corresponding Members \(3\)](#) - William Chadwick, Henry Greist, Brian Hafendorfer
    - [Provisional Corresponding Members \(16\)](#) - Kevin Bowe, Nick Clements, Clifford Cooper, Mohammad Daoud, Nilesh Deshpande\*, Kautuk Dikshit, Liju Eapen, Chris Hsieh\*, Adil Inam, Rajendera Kapoor\*, Mitesh Kumar, Luke Leung, Stephany Mason, Joel McKellar, Dhvani Mehta, Catherine Thibaud

[\\*The TRG4 added 3 new Provisional Corresponding Members since the last Meeting \(Houston, TX\). Welcome Nilesh, Chris, Rajendera to the TRG4.](#)

3. [Membership Present](#) - Voting Members Present (Quorum Present?)

[Members Present \(13\)](#): Marwa Zaatari, Charlene Bayer, Robert Burkhead, Barney Burroughs, Jim Dennison, Elliot Horner, Gemma Kerr, Chris Muller, Jeff Roseberry, Charlie Seyffer, Scott Sherwood, Erica Stewart, Scott Williams

[Members Absent \(2\)](#): Chang-Seo Lee, Nick Agopian

[Voting Members Present: 13 \(of 15\)](#) (as reflected in the Roll-Call)

Quorum Present?: [Yes](#)

[Motions: 1/2 x 15 ~ 8 members needed to be present for a Quorum]

A Quorum to conduct business meetings is established when the number of voting members present is four (4) or exceeds 1/2 of the number of total voting members of the committee, whichever is larger.]

#### [TRG4 Leadership](#)

Chair

Vice-Chair

Secretary

#### [Current \(2-yr/4-Meeting term\)](#)

Marwa Zaatari

Nick Agopian

Dean Tompkins (acting, non-voting)

#### [after 7/1/2020](#)

Nick Agopian

in-development

in-development

Corresponding Members present in the Meeting (0) -

Provisional Corresponding Members present in the Meeting (1) - Chris Hsieh

Guests present in the Meeting (20) – Michael Orcutt, Max Sherman, Dan Mason, Michael Corbat, Tony Abate, Dan Rellihan, Bruce McDonald, Richard Fox, Jatin Sachdeva, Scott Parris, Thomas Caesar, Jenny Berens, Mark Davidson, Gerald Kettler, Gourish Sirdeshpande, David Heidel, Dean Tompkins, Bob Miller, Alan Rosenberg, Charlie Waddell

4. **Ethics Statement** (10:40) (and silence cell phones)

- The Chair presents the Ethics Statement:

*“Commitment to the ASHRAE Code of Ethics – In this and all other ASHRAE meetings, we will act with honesty, fairness, courtesy, competence, integrity and respect for others, and we shall avoid all real or perceived conflicts of interests.”*

(See full Code of Ethics: <https://www.ashrae.org/about-ashrae/ashrae-code-of-ethics>.)

5. **Approval of Meeting Minutes** (10:40) from Summer Meeting (Houston, TX)

Actionable Task(s): **Formal Vote**  
Motion to: **Approve the Houston (24-June-2018) Meeting Minutes of the TRG4**  
Motion by: **Elliot**  
2<sup>nd</sup>-ed by: **Gemma**  
Discussion: **none**

Voting Tally:

For: **9**; Against: **TBD**; Abstain: **2**; Absent: **4** Total: **15**  
Motion: **Passed** [ **9** > 8 (= 1/2 x 15)]

6. **New Voting Members** (10:45)

Seek New Voting Members, as several are dropping off after the Kansas City Meeting (1 July 2019).

Leadership: **Joe Pessa, Mike Sherber, Richard Fox, Bob Miller**  
Voting Member: **Jerry Kettler, Brian Hafendorfer**

7. **Group Discussions** (10:50)

The chair suggested for the committee to be divided into three groups and asked the members for feedback. Members suggested to add 4 groups. Table below describes the 4 groups. The groups would set up goals to meet between now and Kansas City.

Task Force 1 - <a href="#">Dean Tompkins</a>	Task Force 2 - <a href="#">Bob Burkhead</a>	Task Force 3 - <a href="#">Marwa Zaatari</a>	Task Force 4 - <a href="#">Scott Sherwood</a>	?
Identify 145.2 efficiency test compound for each VOC listed in the Table 1 below.	Discuss PM <sub>2.5</sub> and ultrafine testing/limit.	Identify TRG4.IAQP Content (Docs, Graphics, Videos, etc.) and the Methods to successfully disseminate that Content for Education/Edification of the IAQP Method of Std. 62.1	Manufacturers Identify a means of communicate to Equipment Manufacturers	

Task Group #:	<a href="#">1</a>
Title:	<a href="#">Standard 145.2 test compound</a>
Activity:	<a href="#">Identify the appropriate challenge-gas species for each gas listed in Table 1 below.</a>

Individual	Organization	Email
Charlene Bayer	Hygieia Sciences	<a href="mailto:charlene@bayer@gmail.com">charlene@bayer@gmail.com</a>
Gemma Kerr	Canada	<a href="mailto:gkashrae@magma.ca">gkashrae@magma.ca</a>
Erica Stewart	Kaiser Permanente	<a href="mailto:erica.stewart@kp.org">erica.stewart@kp.org</a>
Pawel Wargocki	Denmark Tech University	<a href="mailto:paw@byg.dtu.dk">paw@byg.dtu.dk</a>
Bob Miller	Top Products	<a href="mailto:Bob.Miller@TopProductInnovations.com">Bob.Miller@TopProductInnovations.com</a>
Richard Fox	Honeywell	<a href="mailto:rfox1956@gmail.com">rfox1956@gmail.com</a>
Dean Tompkins (Group 1 Lead)	Dean Tompkins Group	<a href="mailto:deantompkins45@gmail.com">deantompkins45@gmail.com</a>
Don Mason	Bioclimatic	<a href="mailto:dmason@bioclimatic.com">dmason@bioclimatic.com</a>

Task Group #:	2
Title:	PM2.5/Ultrafine
Activity:	Discuss PM 2.5 and ultrafine testing/limit.

Individual	Organization	Email
Jim Dennison	Century	<a href="mailto:jim@centuryenvironmental.com">jim@centuryenvironmental.com</a>
Elliott Horner	UL Env & Sustainability	<a href="mailto:elliottthorner@ul.com">elliottthorner@ul.com</a>
Bob Burkhead (Group 2 Lead)	Blue Heaven Tech	<a href="mailto:bob@blueheaventech.com">bob@blueheaventech.com</a>
Scott Parris	Freudenberg	<a href="mailto:scott.parris@freudenberg-filter.com">scott.parris@freudenberg-filter.com</a>
Charlie Seyffer	Camfil	<a href="mailto:charlie.seyffer@camfil.com">charlie.seyffer@camfil.com</a>
Richard Fox	Honeywell	<a href="mailto:rfox1956@gmail.com">rfox1956@gmail.com</a>

Task Group #:	3
Title:	IAQP dissemination
Activity:	Identify TRG4.IAQP content (docs, graphics, videos, etc.) and the methods to successfully disseminate that content for education/edification of the IAQP Method of Std. 62.1

Individual	Organization	Email
Marwa Zaatari (Group 3 Lead)	enVerid	<a href="mailto:mzaatari@enVerid.com">mzaatari@enVerid.com</a>
Alan Rosenberg	Top Product Innovations	<a href="mailto:alan.rosenberg@topproductinnovations.com">alan.rosenberg@topproductinnovations.com</a>
Scott Williams	Williams Build. Sys. Engr. PC	<a href="mailto:Scott.Williams@WbsEngr.com">Scott.Williams@WbsEngr.com</a>
Chris Hsieh	TRANE	<a href="mailto:chsieh@trane.com">chsieh@trane.com</a>

Task Group #:	4
Title:	<a href="#">Manufacturers</a>
Activity:	<a href="#">In development</a>

Individual	Organization	Email
Gerald Kettler	Std 202, 189.1, USGBC	<a href="mailto:gjkettler@air-engineer.com">gjkettler@air-engineer.com</a>
Mark Davidson	Camfil	<a href="mailto:mark.davidson@camfil.com">mark.davidson@camfil.com</a>
Joe Pessa	Dynamic AQS	<a href="mailto:jpessa@dynamicqaqs.com">jpessa@dynamicqaqs.com</a>
Charlie Waddell	Global Plasma Solutions	<a href="mailto:charlie@gpshvac.com">charlie@gpshvac.com</a>
David Heidel	UVDI	<a href="mailto:david.heidel@uvdi.com">david.heidel@uvdi.com</a>
Dan Rellihan	Plasma Air	<a href="mailto:drellihan@plasma-air.com">drellihan@plasma-air.com</a>
Jeffrey Roseberry	ProMark Associates	<a href="mailto:jeffr@promarkassociates.com">jeffr@promarkassociates.com</a>
Gourish Sirdeshpande	Armstrong World Ind.	<a href="mailto:gsirdeshpande@armstrong.com">gsirdeshpande@armstrong.com</a>
Tony Abate	Atmos Air	<a href="mailto:tabate@atmosair.com">tabate@atmosair.com</a>
Michael Sherber	Plasma Air	<a href="mailto:msherber@plasma-air.com">msherber@plasma-air.com</a>
Ed Light	Building Dynamics	<a href="mailto:elight@building-dynamics.com">elight@building-dynamics.com</a>
Michael Orcutt	Cosatron	<a href="mailto:michael.orcutt@cosatron.com">michael.orcutt@cosatron.com</a>
Scott Sherwood (Group Lead)	EcoCare Corp.	<a href="mailto:ImproveYourAir@gmail.com">ImproveYourAir@gmail.com</a>

8. Design Compounds (approved on/by TRG4.IAQP to date)  
acetaldehyde, toluene, ozone, PM 2.5

Design Compounds from DA-68 of SSPC 62.1: Table 1a.

Adopt the convention of referring to design compounds, PM2.5, and their design targets, as DA-68 has done.

**Table 6.3.2.1 Design compounds, PM2.5, and their design targets**

<u>Compound or PM2.5</u>	<u>Cognizant Authority</u>	<u>Design Target</u>	<u>Notes</u>
<u>Acetaldehyde</u>	<u>Cal EPA CREL (June 2016)</u>	<u>140 ug/m<sup>3</sup></u>	
<u>Acetone</u>	<u>AgBB LCI</u>	<u>1,200 ug/m<sup>3</sup></u>	
<u>Benzene</u>	<u>Cal EPA CREL (June 2016)</u>	<u>3 ug/m<sup>3</sup> (1)</u>	<u>A</u>
<u>Dichloromethane</u>	<u>Cal EPA CREL (June 2016)</u>	<u>400 ug/m<sup>3</sup></u>	
<u>Formaldehyde</u>	<u>Cal EPA CREL (2004)</u>	<u>33 ug/m<sup>3</sup></u>	
<u>Naphthalene</u>	<u>Cal EPA CREL (June 2016)</u>	<u>9 ug/m<sup>3</sup></u>	
<u>Phenol</u>	<u>AgBB LCI</u>	<u>10 ug/m<sup>3</sup> (1)</u>	<u>A</u>
<u>Tetrachloroethylene</u>	<u>Cal EPA CREL (June 2016)</u>	<u>35 ug/m<sup>3</sup> (1)</u>	<u>A</u>
<u>Toluene</u>	<u>Cal EPA CREL (June 2016)</u>	<u>300 ug/m<sup>3</sup></u>	
<u>1,1,1-trichloroethane</u>	<u>Cal EPA CREL (June 2016)</u>	<u>1000 ug/m<sup>3</sup></u>	
<u>Xylene, total</u>	<u>AgBB LCI</u>	<u>500 ug/m<sup>3</sup></u>	
<u>Carbon dioxide</u>		<u>1100 ppm or equivalent to VRP (2)</u>	<u>B</u>
<u>Carbon monoxide</u>	<u>USEPA NAAQS</u>	<u>9 ppm</u>	
<u>PM2.5</u>	<u>USEPA NAAQS (annual mean)</u>	<u>12 ug/m<sup>3</sup> (3)</u>	<u>C</u>
<u>Ozone</u>	<u>USEPA NAAQS</u>	<u>70 ppb</u>	
<u>Ammonia</u>	<u>Cal EPA CREL (June 2016)</u>	<u>200 ug/m<sup>3</sup> (4)</u>	<u>D</u>

- A. Benzene, phenol, and tetrachloroethylene shall not be included in the mixture calculation for upper respiratory tract irritation, eye irritation, and CNS depression as they are not expected to cause these principal effects at the design target.
- B. The design target for carbon dioxide is 1100 ppm or the equivalent steady state concentration calculated using the ventilation rate calculated using the Ventilation Rate Procedure, whichever is higher. Appendix D contains requirements for how to calculate the CO<sub>2</sub> equivalent steady state concentration.
- C. Outside the U.S., if the outdoor concentrations of carbon monoxide, PM2.5, or ozone exceed the Design Target, the limit is equal to the applicable ambient air standards for the region where the project is located if one exists
- D. Ammonia shall be included only for spaces that include non-human animals.

**Table 1b. (current) Design Compounds (DA-68)**

**Table 6.3.2.2. Mixtures of compounds**

<u>Upper Respiratory Tract Irritation</u>	<u>Eye Irritation</u>	<u>Central Nervous System</u>
<u>acetaldehyde</u>	<u>acetaldehyde</u>	<u>acetone</u>
<u>acetone</u>	<u>acetone</u>	<u>dichloromethane</u>
<u>xylene, total</u>	<u>xylene, total</u>	<u>xylene, total</u>
<u>ozone</u>	<u>ozone</u>	<u>1,1,1-trichloroethane</u>
	<u>formaldehyde</u>	<u>toluene</u>

Source: ACGIH, 2017 (See Informative Appendix J, Informative References).

9. Research (11:30)

Update on RTARs:

- TC2.3 has an RTAR proposal entitled

*“Determination of occupant-related indoor air pollution loads considering the effects of the use of consumer products”*

- RTAR Development
  - Lead Author: [Chang-Seo Lee](#)
- Kathleen Owen is the TC 2.3 Research Subcommittee Chair

[Executive Summary of the Current Draft of RTAR](#)

With increased use of various consumer products containing multiple anthropogenic chemicals, the indoor air pollution loads associated with occupants has become different from conventionally considered human bioeffluents. **This study is to determine occupant-related pollution loads considering both bioeffluents and off-gassing from the post-use of general consumer products through chemical and perceived indoor air quality measurements.** This RTAR would provide fundamental information for ventilation design (both VRP and IAQP) and improvement of indoor air quality (IAQ).

[Concerns with the Current Draft of RTAR](#)

The ASHRAE MOP states that a TRG *cannot* support research (See Figure A-3 in the Appendix herein). Therefore, the TRG4 can vote to make a recommendation (a) to the RAC Liaison for Section 4, and (b) for TC 2.3 or SSPC 62.1 to sponsor the research.

- [R&E of SSPC 62.1 and/or TC 2.3](#) has a RTAR submitted entitled

*“Evaluation of Indoor Air Contaminants with respect to Development of Revised Design Compound List”*

- RTAR Development
  - Lead Author: [Gemma Kerr](#)
  - Co-contributors (listed on current RTAR): [Dean Tompkins](#)

Gemma said that she felt that the RTAR approved. Gemma has not seen anything from RAC. It was submitted through the TC 2.3. Who has the Comments? ...

Gemma and Jim requested that Jim be taken off the documentation so that he can be allowed to bid on the Project. It is important to commit this into the meeting minutes and so forth. [NOTE: This action has been taken in these and forthcoming Meeting Minutes.]

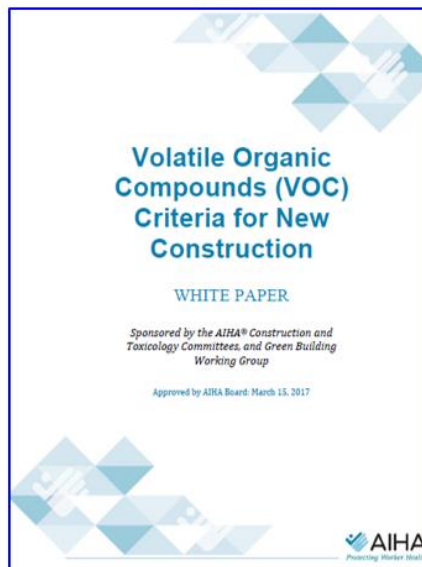
**Executive Summary (from current draft of RTAR)**

The research will include a review of literature on indoor concentrations of contaminants in non-residential structures, guidelines on acceptable concentrations, and toxicological **information on compounds that warrant consideration for a revised list of 62.1 IAQP Design Compounds with pertinent reports for committees to re-evaluate the Design Compound list.**

No Action was taken on the matter of this RTAR, as the TC 2.3 will be the cognizant authority and likely research project sponsor.

**10. Discussion of AIHA White Paper entitled “Volatile Organic Compounds for New Construction” (11:45)**

- Sponsored by the AIHA Construction and Toxicology Committees and Green Building Working Group (Ed Light, champion)
- Approved by the AIHA Board: March 15, 2017



Actionable Task(s): **Form a group to assess the topics in the White Paper that are relevant to the IAQP**

Participants: **Gemma, Nick, Marwa, Jeff, Jim, volunteer Erica**

Ed spoke on Questions by the AIHA White Paper included:

- 1) Have the health effects been demonstrated for VOC concentrations found in indoor air?
- 2) Do cognizant authority concentration limits predict health effects?
- 3) What is known about health effects of VOC mixtures?

Ed mentioned the below:



The white paper is first step in re-examining the basis for our current approach to VOC mixtures (i.e., focus on cognizant authority concentration limits for individual compounds). An important topic of discussion in Atlanta was how to credit air cleaning in determining whether less ventilation is acceptable when VOC levels are reduced. A standardized procedure is needed to objectively measure the efficacy of air cleaning, and I support current TRG4 efforts to designate representative design compounds as the basis for evaluating VOC reduction. The issue I am raising is how to determine if overall IAQ after air cleaning is acceptable under reduced ventilation.

11. [New Business](#) (11:55)

- None

12. [Adjournment](#) (11:58)

Actionable Task(s): [Formal Vote](#)  
Motion to: [Adjourn the TRG4 Meeting](#)  
Motion by: [Dean](#)  
2<sup>nd</sup>-ed by: [Chris Muller](#)  
Discussion: [none](#)

Voting Tally:

For: [11](#); Against: [0](#); Abstain: [0](#); Absent: [4](#); Total: [15](#)

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